

Activity 2

Electricity and Your Community

Think About It

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- What are some consequences of not having electricity when it is needed?



WHAT DO YOU THINK?

Activity 2

Investigate Part A

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World Net Electricity Generation by Type, 1998 (in billions of kilowatt hours)					
Region Country	Fossil Fuels	Hydro	Nuclear	Geothermal and Other	Total
North America					
Canada	148.7	328.6	67.7	6.1	551.1
Mexico	134.2	24.4	8.8	5.4	172.8
United States	2550.0	318.9	673.7	75.3	3617.9
The Caribbean & South America					
Bolivia	2.0	1.4	0.0	0.1	3.5
Brazil	15.6	288.5	3.1	9.7	316.9
Puerto Rico	17.0	0.3	0.0	0.0	17.3
Venezuela	21.6	52.5	0.0	0.0	74.0
Western Europe					
France	52.9	61.4	368.6	2.8	485.7
Spain	93.2	33.7	56.0	3.5	186.4
Switzerland	2.3	33.1	24.5	1.1	61.1
United Kingdom	235.3	5.2	95.1	6.2	341.9
Eastern Europe & Former U.S.S.R.					
Bulgaria	20.2	3.3	15.5	0.0	39.0
Romania	27.5	18.7	4.9	0.0	51.1
Russia	530.1	157.9	98.3	0.0	786.3
Middle East					
Cyprus	2.8	0.0	0.0	0.0	2.8
Saudi Arabia	116.5	0.0	0.0	0.0	116.5
Africa					
Angola	0.5	1.4	0.0	0.0	1.9
Egypt	47.1	12.1	0.0	0.0	59.2
Ethiopia	0.0	1.6	0.0	0.0	1.6
Morocco	11.6	1.7	0.0	0.0	13.4
Far East & Oceania					
China	880.2	202.9	13.5	0.0	1096.5
Japan	571.3	91.6	315.7	23.8	1002.4
Malaysia	52.5	4.8	0.0	0.0	57.3
Mongolia	2.5	0.0	0.0	0.0	2.5
Nepal	0.1	1.1	0.0	0.0	1.2
Total	5535.7	1645.1	1745.4	134.0	9060.3

1a. List the three countries that generate the most electricity.

1b. What type of electricity generation is used most by these areas? Least?

1c. List the three countries that generate the least electricity.

1d. What type of electricity generation is used most by these areas? Least?

1e. How do the resources for electricity generation differ between the top and bottom regions? How do you account for the differences?

2a. Rank **global** electricity generation by fuel type from highest to lowest without the United States.

2b. List **U.S.** energy generation by fuel type from highest to lowest.

2c. How does the electricity generated in the U.S. compare to global electricity generation?

3a. Make a bar graph that shows how much of each type of energy source is used by the U.S.

Activity 2

Electricity and Your Community

Digging Deeper

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Energy

the ability to cause change

When an object has energy, it can make things happen

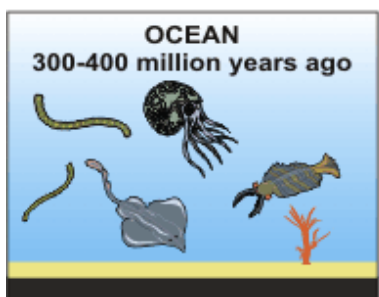
Anytime a change occurs, energy is transferred from one object to another

All objects have energy

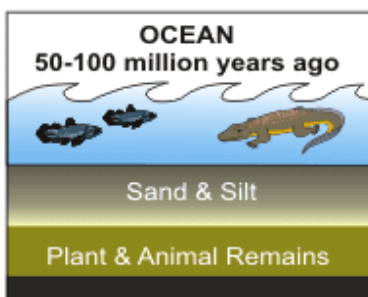
Fossil fuels

fuels that form from the remains of plants and other organisms that were buried and changed over millions of years

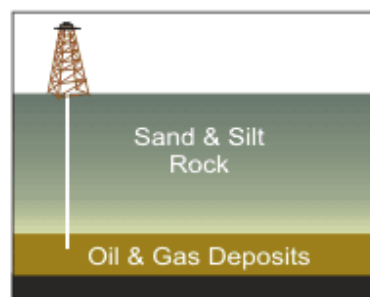
PETROLEUM & NATURAL GAS FORMATION



Tiny sea plants and animals died and were buried on the ocean floor. Over time, they were covered by layers of silt and sand.



Over millions of years, the remains were buried deeper and deeper. The enormous heat and pressure turned them into oil and gas.



Today, we drill down through layers of sand, silt, and rock to reach the rock formations that contain oil and gas deposits.

Coal, oil and natural gas are fossil fuels



They supply about 70% of the energy sources for electricity in the U.S.

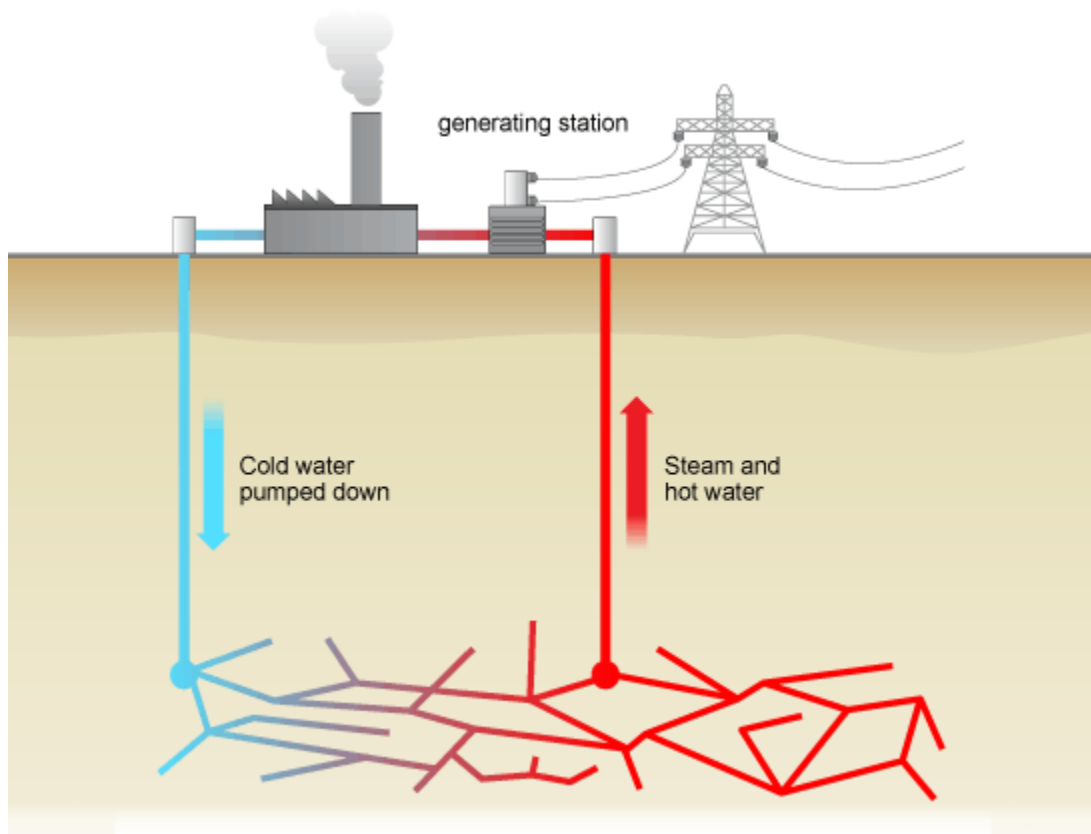
Burning fossil fuels

creates pollution

Geothermal energy

energy from hot rocks or magma under Earth's surface

Water is pumped down to the hot rocks or magma and becomes heated and is pumped back up to the surface



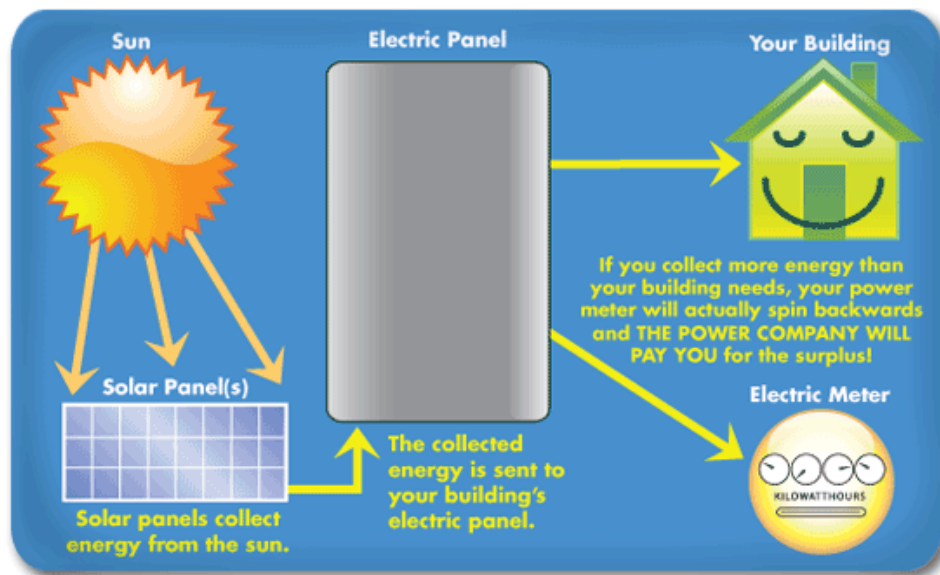
The heated water is turned to steam that turns a turbine that runs a generator to produce electricity

http://www1.eere.energy.gov/geothermal/gpp_animation.html

<http://www.youtube.com/watch?v=rfUQy86ZMpQ&feature=related>

Photovoltaic energy

created when solar energy (from the sun) is changed into electricity



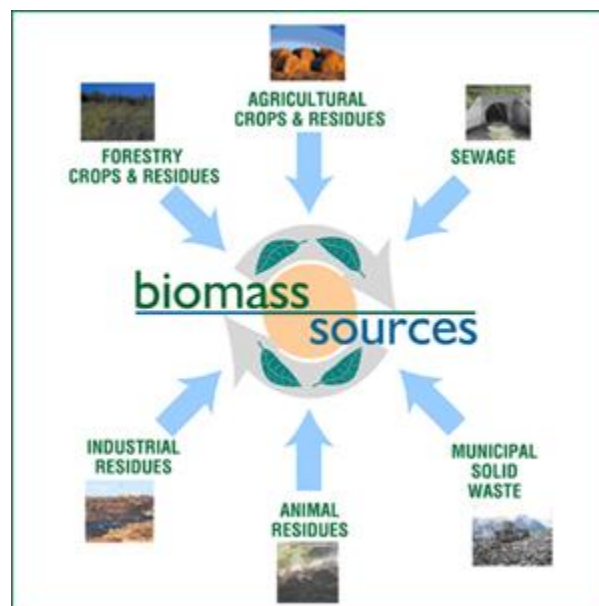
<http://www1.eere.energy.gov/solar/video/pv4.mov>

Biomass

organic material that can be used to produce electricity

Examples of biomass

- wood
- paper
- food
- manure
- garbage



Turbine

a set of fan blades powered by steam that spins a generator at a power plant

Most of the electricity in the United States is produced in steam turbines

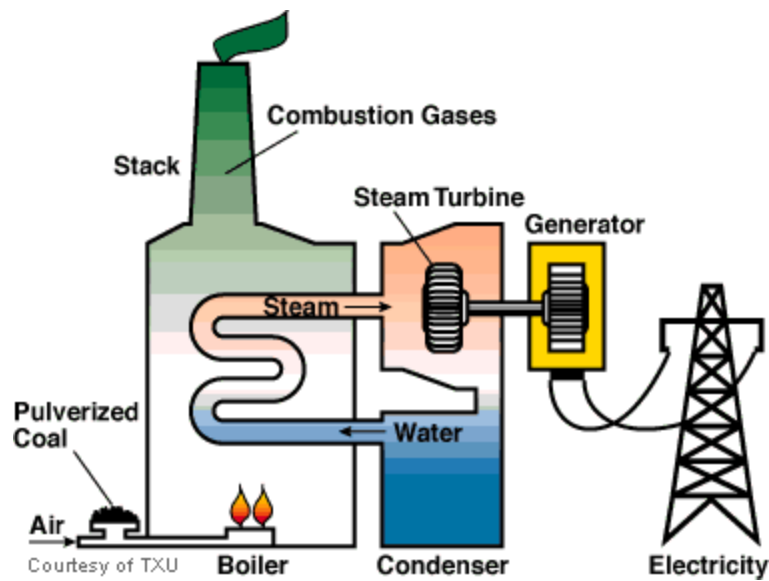


<http://www.youtube.com/watch?v=rfUQy86ZMpQ&feature=related>

How turbines
produce electricity

water is heated to produce steam,
which is put under pressure to turn
the turbine

The turbine powers a generator
that produces electricity



Renewable energy source

energy created from natural resources that does not run out

Hydroelectric power

electricity produced by flowing water

Hydroelectric power, geothermal and photovoltaic energy are all renewable energy sources



http://www.ucopenaccess.org/courses/APEnvSci/course%20files/multimedia/lesson68/animations/4e_hydroelectric_power.html

Hydroelectric power
in the United States

70% is generated in the Pacific
and Rocky Mountain States

Advantages

- water is a renewable resource
- cheap source of power
- little air pollution
- can start quickly because we don't have to wait for the water to turn to steam
- flow can be adjusted quickly for changes in electricity demand

Disadvantages

- environmental impacts from damming rivers and streams
 - affects the habitats of local plants and animals
- depends on flow of water, which can vary with seasons and during droughts

Act. 2**Check Your Understanding**

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1. Compare and contrast steam power with hydroelectric power generation. How are they alike? How are they different?

2. What are the advantages and disadvantages of hydroelectric power?